

WHAT IS CLAIMED IS:

- 1 1. An alkaline battery comprising:
2 a cathode comprising nickel oxyhydroxide and a gold salt;
3 an anode comprising zinc;
4 a separator between the anode and the cathode; and
5 an alkaline electrolyte.
- 1 2. The battery of claim 1, wherein the nickel oxyhydroxide includes beta-nickel
2 oxyhydroxide.
- 1 3. The battery of claim 1, wherein the nickel oxyhydroxide includes gamma-
2 nickel oxyhydroxide.
- 1 4. The battery of claim 1, wherein the nickel oxyhydroxide includes a mixture of
2 beta-nickel oxyhydroxide and gamma-nickel oxyhydroxide.
- 1 5. The battery of claim 1, wherein the nickel oxyhydroxide includes unfractured,
2 substantially spherical particles.
- 1 6. The battery of claim 5, wherein the gold salt is selected from the group
2 consisting of gold (+3) oxide, gold (+3) sulfide, gold (+3) hydroxide, and gold (+3) acetate.
- 1 7. The battery of claim 6, wherein the cathode includes between 5 ppm and 1000
2 ppm of the gold salt.
- 1 8. The battery of claim 6, wherein the cathode includes between 10 ppm and 200
2 ppm of the gold salt.
- 1 9. The battery of claim 6, wherein the cathode includes between 15 ppm and 100
2 ppm of the gold salt.

10. The battery of claim 6, wherein the anode includes a gelling agent.

11. The battery of claim 1, wherein the nickel oxyhydroxide is cobalt oxyhydroxide-modified nickel oxyhydroxide.

12. The battery of claim 11, wherein the cobalt oxyhydroxide-modified nickel oxyhydroxide has a coating of a cobalt oxyhydroxide on a surface of a nickel oxyhydroxide.

13. The battery of claim 12, wherein the coating is substantially uniform.

14. The battery of claim 11, wherein the cobalt oxyhydroxide-modified nickel oxyhydroxide is derived from nickel hydroxide coated with between 2% and 10% cobalt hydroxide by weight.

15. The battery of claim 11, wherein the cobalt oxyhydroxide-modified nickel oxyhydroxide is derived from alpha-nickel hydroxide.

16. The battery of claim 11, wherein the cobalt oxyhydroxide-modified nickel oxyhydroxide is derived from beta-nickel hydroxide.

17. The battery of claim 11, wherein the gold (+3) salt is selected from the group consisting of gold (+3) oxide, gold (+3) sulfide, gold (+3) hydroxide, and gold (+3) acetate.

18. The battery of claim 17, wherein the anode includes a gelling agent.

19. The battery of claim 1, wherein the nickel oxyhydroxide is derived from alpha-nickel hydroxide.

20. The battery of claim 1, wherein the nickel oxyhydroxide includes a dopant including aluminum, cobalt, manganese or silver.

21. The battery of claim 1, wherein the cathode includes less than about 1,000 ppm of the gold (+3) salt.

1 22. The battery of claim 1, wherein the cathode includes between 5 ppm and 500
2 ppm of the gold salt.

1 23. The battery of claim 1, wherein the cathode includes between 10 ppm and 200
2 ppm of the gold salt.

1 24. The battery of claim 1, wherein the cathode includes NaOCl, K₂S₂O₈,
2 Na₂S₂O₈, KMnO₄, BaMnO₄, BaFeO₄, AgMnO₄, or AgO.

1 25. The battery of claim 1, further comprising TeO₂, CaS, or Bi₂O₃.

1 26. The battery of claim 1, further comprising zinc oxide, calcium fluoride, NiO,
2 MnO₂, Zn(OH)₂, CaO, Ca(OH)₂, CaSO₄, MgO, Mg(OH)₂, MgSO₄, Ba(OH)₂, BaSO₄,
3 Sr(OH)₂, Yb₂O₃, Y(OH)₃, Er₂O₃, In₂O₃, Sb₂O₃, TiO₂, BaTiO₃, CaTiO₃, Gd₂O₃, Sm₂O₃, CeO₂,
4 CdO, Ag₂O, BaO, CaWO₄, CaSi₂O₅, or SrTiO₃.

1 27. The battery of claim 1, wherein the battery is a primary battery.

1 28. The battery of claim 27, further comprising a thulium salt.

1 29. The battery of claim 28, wherein the thulium salt includes thulium (3+) oxide
2 or thulium (3+) sulfate.

1 30. The battery of claim 27, wherein the capacity loss is less than 40% after
2 storing the battery at 60°C for 4 weeks.

1 31. The battery of claim 27, wherein the capacity loss is less than 30% after
2 storing the battery at 60°C for 4 weeks.

1 32. The battery of claim 27, wherein the capacity loss is less than 10% after
2 storing the battery at 60°C for 4 weeks.

1 33. The battery of claim 1, wherein the cathode includes a conductive carbon.

1 34. A primary alkaline battery comprising:

2 a cathode comprising nickel oxyhydroxide and a gold salt selected from the
3 group consisting of gold (+3) oxide, gold (+3) sulfide, gold (+3) hydroxide,
4 and gold (+3) acetate;

5 an anode comprising zinc;

6 a separator between the anode and the cathode; and

7 an alkaline electrolyte.

1 35. The battery of claim 34, wherein the nickel oxyhydroxide includes beta-nickel
2 oxyhydroxide.

1 36. The battery of claim 34, wherein the nickel oxyhydroxide includes gamma-
2 nickel oxyhydroxide.

1 37. The battery of claim 34, wherein the nickel oxyhydroxide includes a mixture
2 of beta-nickel oxyhydroxide and gamma-nickel oxyhydroxide.

1 38. The battery of claim 34, wherein the nickel oxyhydroxide includes
2 unfractured, substantially spherical particles.

1 39. The battery of claim 34, wherein the cathode includes between 5 ppm and 500
2 ppm of the gold salt.

1 40. A method of manufacturing an alkaline battery, comprising:

2 obtaining a cathode mixture comprising nickel oxyhydroxide, a gold salt, and
3 an alkaline electrolyte; and

4 assembling a cathode containing the cathode mixture, an anode comprising
5 zinc, and a separator between the cathode and the anode to form the alkaline battery.

1 41. The method of claim 40, further comprising mixing an aqueous alkaline
2 solution containing the alkaline electrolyte and a gold salt with nickel oxyhydroxide to form
3 the cathode mixture.

1 42. The method of claim 40, wherein the nickel oxyhydroxide includes gamma-
2 nickel oxyhydroxide, beta-nickel oxyhydroxide or mixtures thereof.

1 43. The method of claim 40, wherein the nickel oxyhydroxide includes a nickel
2 oxyhydroxide cobalt oxyhydroxide modified-nickel oxyhydroxide.

1 44. The method of claim 40, wherein the nickel oxyhydroxide includes
2 unfractured, substantially spherical particles.